

An Empirical Evidence of The Impact of Inventory Management on The Profitability of Manufacturing Companies

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Abstract

This study examined the impact of inventory management on the profitability of a manufacturing company. A case study research design was applied on the inventory system of a reputable manufacturing company. The secondary data employed in this study was collected from the financial statement the company for the period 2015-2020, in which the data were analysed using the Multiple linear regression model. The result shows that Raw Material Cost and Storage Cost are having negative and insignificant relationship on the profitability of a manufacturing company. On the other hand, Inventory Conversion Period is having a positive and significant relationship on the Returns on Assets. The study therefore recommended that the management of manufacturing companies need to adopt proper inventory management systems in order to control raw materials costs, reduced the working capital cycle, and minimize storage cost such as holding costs, ordering costs among others hence increasing company profitability.

Keywords: Inventory Management, Manufacturing companies, Inventories, Storage costs.

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1. Introduction

A study conducted by Yunusa (2021) indicated that the word Inventory first came into records in 1601. It came from the French term *inventaire*, or “detailed list of goods”, dated back to 1415. In most businesses, inventory management mainly focused on the quantity and placement of stocked goods. Inventory management is one of the key strategies employed by modern organizations as a way of having a competitive advantage over competitors and a way of maximizing profits at large. The primary objective of managing inventory is the acquisition of the right quantity and quality of materials at the right time, whilst keeping the cost of holding stock as low as possible to fully acquire the benefits of managing inventory Ajeyi, et al (2021).

For most organizations, Inventory management represents a major asset and constitutes a significant portion of total operational costs. So, it’s paramount for organization to avoid poor Inventory management because it would hinder the profits of the organization. Burt (2016) posits that Inventory management is the efficient administration of how orders for material goods, services, supplies are brought into the organization.

In recent times, manufacturing industries has contributed greatly towards the economic development of both developed and developing nations through the creation of employment opportunities, innovations and the generation of revenues for government through taxes and thus contributed positively to the gross domestic product of a country’s economy. The fundamental role of manufacturing industries is the conversion of idle resources and raw materials to finished goods and for more productive use in the society with the sole aim of maximizing shareholder’s wealth. Inventories serve as a vital component towards the success of manufacturing companies. They represent an important variable at all stages of product manufacturing, sales and distribution, and hence forms a major portion of current assets of many organizations. Therefore, management of inventories serves as critical concerns for most manufacturing companies Ajan & Kamal (2016). Ngugi, et al (2019) asserted that for inventory to be properly managed with the aim of achieving desired results, management should implement an effective and efficient inventory control system in place. Ajeyi, et al (2021), views inventory management as the process of coordinating, procuring and utilizing available materials that are to be used in the production process whether the inventory include raw materials, work-in-progress and finished goods. NdiranguKung’u (2019) further posits that inventory must be effectively managed and utilized properly with the aim of facilitating the operation of the firm and achieving desired results as well.

According to Otieno & Samson (2018), for most inventory managers, their primary concern is to achieve the traditional five (5) R’s of ensuring that the right goods are being provided in the right condition at the right place with the right price and at the right time. Otieno & Samson (2018) noted that the main aim of inventory management is to maximize shareholders profit from the invested inventory while at the same time maximizing customers’ satisfaction. For inventory management to

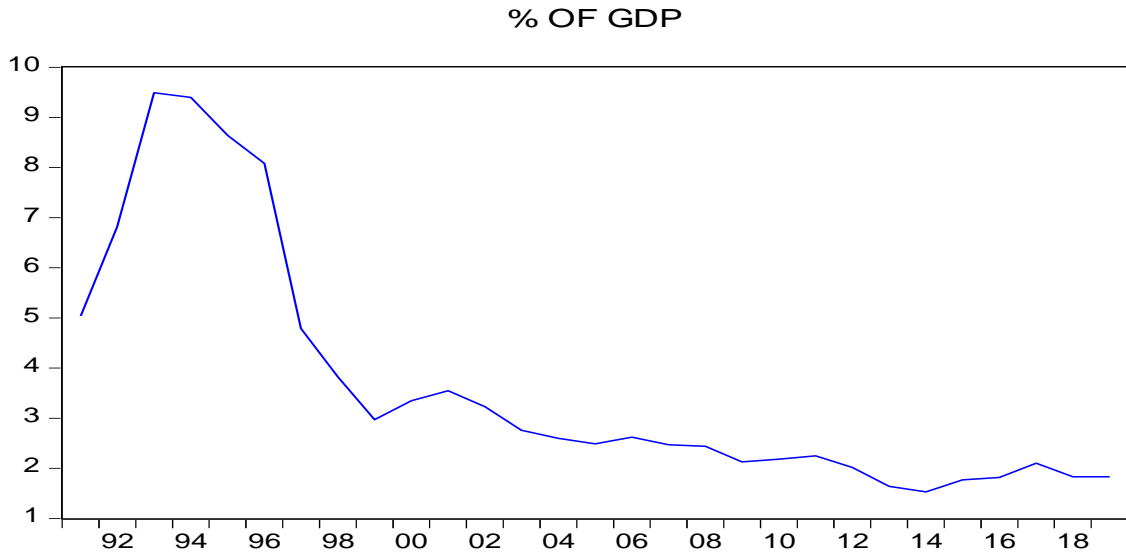
be effective, management needs to incorporate an accurate stock recording and effective training.

According to Opoku, et al., (2020), one of the key challenges involved with inventory management by most manufacturing companies is the balancing of supply for and demand for inventory in the market with the aim of making inventory available to stakeholders with the most cost effective and timely manner. When inventory is not properly managed, it can result in a lot of adverse effects to the company such as theft, damages, obsolesce, improper stock recording, mismanagement which will invariably result to the reduction of profit and hence increases in additional controllable costs (Duramany-Lakkoh et. al., 2021a). Opoku, et al., (2020) posits that, inventory must be efficiently managed because substantial amount of shareholder`s funds has been invested in it with the aim of meeting customer`s demand in the market. However, manufacturing of inventory must be at par because an excess of it will lead to spoilage and idle stock, while shortage of it will lead to an increase in demand for it in the market by customers, which will result in reduction of profit made by the manufacturing company.

1.1 Overview of the Sierra Leone Manufacturing Industry

Sierra Leone is a developing country with a population of over 7.5 million people Statistics Sierra Leone (2021). Sierra Leone as a developing nation has encountered 11 years` civil war which started from 1991 to 2002. According to World Bank (2015) report, the civil war in Sierra Leone led to an economic contraction of 3.4 percent on average per year during this decade. However, the manufacturing sector has contributed immensely towards the economic development of the nation`s economy. According to Duramany-Lakkoh, et. al., (2021b) the manufacturing industry in Sierra Leone has been volatile despite its contribution to the economic growth in Sierra Leone. They further noted that in 1970, the manufacturing industry contributed to 5.5% to the Sierra Leone GDP and contributed 26.42% in the Sierra Leone economy during 2002 and further experiences a drastic fall in 2014 with a negative contribution of -7.12%, due to the Ebola outbreak.

According to World Bank Forum (2012); World Bank (2021), the Sierra Leone economy has been rated as the second least economy in the world with the manufacturing industry contributing over 1.8% of the SL GDP during 2011. The country`s economy has been ranked 140 out of 185 countries according to World Bank for the flexibility of the country business environment. Evidence in World Bank Forum (2012) in report shows the manufacturing industry and industrial production are expected to grow to 15% and 9.7% in years to come. The manufacturing industries in Sierra Leone has captured the attention of the government in ensuring stability and expansion nationwide, however, the number of manufacturing industries have increased to 23. In terms of performance, the manufacturing industries have contributed to the gross domestic product of the Sierra Leone economy see the chart in figure 1 below.



Source: World Development Bank Indicators 2011

Figure 1: Contribution of the Manufacturing Industry to Sierra Leone GDP

The chart above presents the contribution of the manufacturing industries to the GDP of the Sierra Leone economy. However, the contribution to the GDP has been fluctuating in an increasing rate. During the period 1991 to 1997, the manufacturing sector recorded its highest contributions to the GDP of the economy and drastically fell from 1998 to 2019. In 2014, the industry experiences a great decline in its contribution of 1.53% to GDP, this may be because of the Ebola outbreak.

1.2 Problem Statement

Inventory management in manufacturing industries involves the process of keeping track of all goods at all stages in the manufacturing cycle. Yunusa (2021) revealed that effective inventory management helps enhancing firm operations, especially with the progress in technology which produces goods in greater and faster quantities, and with multiple style and design. They further noted that firms with adequate inventories of raw materials, work in progress, semi-finished goods and finish goods can relatively increase production, allow free flow of stocks and as well as makes inventories accessible to their customers at relatively lower cost. Yunusa (2021), posits that inventories serve as an important asset of manufacturing companies and thus form major portion in the production process. As a result, an implementation of effective management of inventories will help to reduce losses that may arise from stock surpluses and deficits by manufacturing firms. He further noted that inventories as current assets serve as a significant element that add value to the firm profitability base through the resale process. Therefore, management of inventories will help in minimizing cost and thus adding value to capital.

Since after the global financial crisis in 2008, the Sierra Leone economy like many

other nation`s has been experiencing an extreme change in terms of its performance. However, the performance of the manufacturing industry has been fluctuating with it registering negative output in 2014 with -17.21% and recorded 0.37% in 2015, 4.81% in 2016, 4.94% in 2017 and 3.25% in 2018 respectively Duramany-Lakkoh, et al., (2021).

The management of inventory is very important in manufacturing companies since it increases firm operations. Manufacturing companies have high levels of finished goods which offer a variety of products and delivery goods to its customers at the right time (De Leeuw, et al., 2011). In Kenya for instance, there has been high decrease of sales margin to 3.1% from 2013 to 2015 with inefficiency of inventory management systems implemented. This was due to company weakness because of over stocking, under stocking, and failure to meet company targets Statistics Kenya Bureau (2016). The company`s stores are overcrowded making the movement of goods to be hard hence affecting the service delivery in the stores Onyango (2013). The same can be said for Sierra Leone, there has been high decrease of sales margin to 7.1% from 2017 to 2020 with inefficiency of inventory management systems implemented Sierra Leone Ministry of Trade (2020). Yunusa (2021) reported that industries in Africa countries such as in Kenya, have ignored on how inventory management systems help in reduction of costs incurred by inventory but they end up using more funds in investing on inventory. The companies are not able to meet customer demands due to poor supply of inventory, hence affecting firm performance. Industries gain profit from effective and efficient inventory since it amounts between 59%-67% of total costs Mulumba (2016).

Mogere (2013) investigated on how inventory control systems affect performance of Gianchore Tea Factory, Nyamira County, Kenya where they found out that inventory management systems help in controlling of inventory, improves lead time management, enhancing customer supplier relationship, hence enhancing competitive advantage.

For most studies that have been conducted on inventory management in Sierra Leone and across the African continent, there are limited studies which have focused on how cost of raw materials (RM); inventory conversion period (ICP); storage cost (SC) and sales turnover (ST) affects performance of manufacturing companies. The study therefore aimed to expand results of previous studies by assessing new variables of inventory management and bridged the gap of knowledge in the relationship between inventory management and performance of manufacturing companies in Sierra Leone.

1.3 Aim and Objectives of the Study

The main aim of this study is to assess the impact of inventory management on the profitability of manufacturing company in Sierra Leone.

The following are the specific objectives of the study:

- i. To ascertain the effect of raw materials cost on the profitability of a manufacturing company in Sierra Leone.
- ii. To determine the effect of storage cost on the profitability of a manufacturing company in Sierra Leone.
- iii. To establish the effect of inventory conversion period on the profitability of a manufacturing company in Sierra Leone.

1.4 Research Questions

The following research questions have been designed to effectively carry out the study:

- i. What effect does material cost have on the profitability of the manufacturing company in Sierra Leone?
- ii. To What extent does storage cost affect the profitability of the manufacturing company in Sierra Leone?
- iii. What effect does inventory conversion period has on the profitability of manufacturing company in Sierra Leone?

1.5 Significance of the Study

The importance of this study depends on its ability to cover an identifiable gap and contribute to existing literature in the subject area; studies that have been conducted on the Sierra Leone environment and across the African continent do not cover information from the most recent time scope of study. The study covers the period 2015-2020; the study will be of great significance to the following categories of stakeholders: shareholders, government, potential investors, researchers and management of manufacturing companies. The study will provide government with information on the financial performance of manufacturing companies in Sierra Leone which will serve as a yardstick for tax reduction or increment on the various manufacturing companies in Sierra Leone. Shareholders together with potential investors will be assisted in identifying various approaches to investment by exploring available investment opportunities and minimizing the tendencies of high value losses in the manufacturing sector. In the area of management, the study will be helpful in reducing cost associated with inventory such as: storage cost, raw materials cost, handling cost, labor cost etc. through the implementation of various inventory control systems.

The study will also be of benefit to management around effective planning to edge competition by ensuring the right quantity of the product is readily available.

Moreover, the researcher will be able to understand the operations of manufacturing companies especially the case study in relation to inventory management.

Finally, the recommendation and findings of the study will greatly inform the public

as to how manufacturing companies have created positive impacts towards the economic development of the Sierra Leone economy.

2. Literature Review

This chapter provides the existing literature that is being evaluated by different authors or researchers, and scholars. It covers the conceptual framework which includes; inventory, classifications of inventory and inventory management. The literature also covers the theoretical review which stresses on the different theories relating to the study such as the strategic choice theory, the economic order quantity model, the lean theory, and the theory of constraints etc. The economic order quantity, the Just-In-time technique, and the ABC analysis are all Inventory management techniques covered in this chapter.

2.1 Basic Classification of Inventories

Inventory according to Ibrahim. Umar (2016) and NdiranguKung'u (2019), and can be classified into three such as the raw material inventory, work-in-progress inventory and finished product. Raw material is seen as all kinds of items purchased by a firm which can be used for further production process. The raw material for production of cement includes calcium, carbonate, silica, alumina and iron ore and these items are extracted from limestone, chalk and clay. More so, the raw materials to produce ceramic products are clay minerals and aluminium oxide. Work in progress is also seen as partly finished products which are between manufacturing stages. This implies that work in progress has passed the stage of raw material but not yet converted to finished products. The raw material could also be referred to as goods-in-progress inventories which at the immediate stage of raw material inventory that are yet to be completed. Thus, work in progress entails materials that have been partly possessed at the production stage but not yet completed for consumption.

In addition, Anichebe (2013) noted that finished goods are the products which has been completed and awaiting shipment or to be moved to the warehouse. The moment products have been completed the next stage is how to make sure it is delivered to the customers while the remaining stock which may not be required immediately are warehouse. Thus, finished products could be seen as those outputs from the production process. For effective management of stock, the basic knowledge of various stock levels is required.

a. Minimum Stock Level

Minimum stock level refers to the level of item of stocks which the firm will not allow it to fall below. This according to Elsayed (2014) refers to the minimum quantity of a particular item of material which must be held in the stores consistently. The minimum stock level is also referred to as safety stock or buffer stock and the aim is to ensure continuous flow of production. Barde (2015); Umar (2016); Agu *et. al.* (2013), noted that the factors that must be put into consideration are average

level of material consumption, the time required to obtain new products, re-order level, production requirement of such material and the lowest amount of inventory that could be procured with the most efficient cost.

b. Maximum stock level

The maximum stock level is seen as the maximum quantity of stock those firms should not exceed. This is because, the moment firms keep stock beyond these quantities it becomes overstocking and will amount to several associated costs which would have been avoidable. Yunusa (2021) argued that overstock could amount to unnecessary tying down capital, pilferage obsolescence and so on. Fornah & Pujawan (2020) revealed that firm maximum stock level largely depends on certain conditions such as available capital, maintaining cost, likelihood of stock/production fluctuation, firm's policies as well as available storage facilities.

c. Average stock level

The average stock level is determined using the formula: minimum stock level + half the reorder quantity. This implies that for this information where maximum consumption = 320 units per day, minimum consumption = 160 unit per day normal consumption is 200 units per day, reorder period = 12-18 days, reorder quantity = 1900 units and normal reorder period is 12 days. To determine the reorder level = maximum consumption by maximum reorder period = $320 \times 18 = 5,760$ units, minimum stock value = reorder level less (normal consumption by normal reordering period). Thus, we have; $5,760 - (200 \times 12) = 5,760 - 2400 = 3360$ units.

2.2 Theoretical Literature Review

According to Stevenson (2010), Inventory Management is defined as a framework employed by firms in controlling their interest in inventory. It includes recording and observing stock levels, estimating future requests, and settling on when and how to arrange them. On the other hand, Deveshwar & Dhawal (2013), proposed that inventory management is a method that companies use to organize, store, and replace inventory, to keep an adequate supply of goods while at the same time minimizing cost. Choi (2012) Indicates that effective inventory management is essential in the operation of any business. Thus, keeping stock is used as an important strategy by companies to meet customers' needs without taking the risk of frequent shortages while maintaining a high service level. As Axsäter (2006) describes, inventories make a high cost, both in the sense of tied up capital and operating and administrating the inventory itself. It is argued that the time from ordering to delivery of replenishing the inventory, referred to as the lead time, is often long and the demand from customers is almost rarely completely known. There are theories implored in establishing the relationship between inventory management and a firm's performance. Some of the major theories include the theory of Constraints and Lean Theory to develop the major concerns regarding the impacts of inventory management on the profitability of manufacturing companies.

2.2.1 Theory of Constraints

The Theory of Constraints is a management rationale aimed at maximizing production, and throughput proficiency evaluated based on procedurally identifiable evidence that limits the production system. The theory of constraints has many problems. For example, long delivery time, many unsatisfactory orders, irregular state of stale or insufficient stock, unsuitable material requirements, high volume and response rate to crisis orders, lack of customer commitment, orders requiring Instructions no oversight, schedule, and prescription. This theory focuses on how to properly address the limitations and opportunities of these limits to increase efficiency, and this can be achieved using the manufacturing company's warehouse stockpiling procedures. The theory of constraints is an approach whose propositions relate to the generation aimed at reducing the organizational stock.

2.2.2 The Lean Theory

This theory was developed in Arsenal in Venice in the 1450s by Henry Ford because of his thoughts on the integrated manufacturing process. Lean inventory theory which is an extension of Just-in-Time is an inventory control philosophy that emphasized that organizations should maintain minimum inventory in line with the requirement of the production process Fawcett, et al (2006). Lean inventory theory was pioneered by Womack (1990) which was based on the principle of maintaining reduced inventories in the organization. The argument in favor of a reduced or lean inventory system is that it leads to improvement in the company's profitability owing to a reduction in inventory carrying costs. Lean inventory theory focuses on cost minimization in organizational inventory systems by taking decisions centered on manufacturing, warehousing, and general supply chain Egbunike (2017). According to Njeru (2016) the theory (Lean) tends to build on the postulation of Economic Order Quantity (EOQ) which seeks to optimize the number of inventories by determining the appropriate quantities of inventory to order per time. From the foregoing, the theory brings to the fore, the possibility of being dynamic in manufacturing and operating system used for different treatments. In a highly competitive environment, lean inventory theory helps firms to gain a competitive advantage, capture larger market shares and make more profit since carrying excess inventories negatively affects a firm's net cash flow Lydia (2016).

The theory is based on the idea of Just in Time (JIT) augmentation. Temporary Dumping Theory and Waste Reduction in the Manufacturing Process. Inventory leanness affects a company's productivity and is the best tool for inventory management. The theory explains how producers' ability to choose delivery requirements for goods and merchandise is reduced to eliminate costs associated with transporting goods and merchandise. The feedback filed against the theory indicates that the content must be available when it comes to it exchange of data and information in the context of remote cooperation and exchange of partners between companies.

2.2.3 The Strategic Choice Theory

The Strategic choice theory explains the relationship between top management choices and the performance of organizations as well as the interaction of the internal and external organizations. The theory stresses the importance of management decisions on organizational performance Child (2009) and Michelson (2015) established a strategic choice model that depicts the interdependence among the environment and organizations, actions, and overall firm performance. The model aims at achieving high-performance standards to increase efficiency where there is a limited resource, the theory failed to give much importance to contextual factors like environment, technology, and scale of operation into consideration and only considered how organizational structure aid in the performance of an organization.

Any organization with managers given power and responsibilities to direct and decide regarding factors like inventory investment and the amount of inventory to carry have significant effects on organizational outcomes as well as performance Child (2015). The right management choice will depend on environmental factors like suppliers, purchasing, and inventory management decisions made by the management. The theory is significant to this study by understanding inventory management processes as it shows the relationship between top management choices and organization performance.

2.3 Inventory Management Techniques

The management of inventory is critical to businesses as it is primarily focused on cost reduction while satisfying the demand of customers by providing reasonable assurance on the sustainability and obtainability of balanced items of stock at the right quality, quantity, and at the right time and in the right place. This section primarily aimed at reviewing the literature on inventory management techniques.

2.3.1 Economic Order Quantity (EOQ)

According to Bowersox (2002), inventory management needs to be organized logically way so that the organization can be able to know when to order and how much to order. This must be attained through calculating the Economic Order Quantity (EOQ). Monetary request amount engages correlation to arrange their stock re-establishment on an ideal premise. For instance, the arrangement can be scheduled to happen from month to month, quarterly, half-yearly, or yearly. By so doing, it enables firms to have insignificant limit costs or zero inside their circulation focuses. Along these lines, as associations attempt to enhance stock administration, the EOQ and Re-Order Point (ROP) are necessary instruments that associations can utilize.

2.3.2 Just-in-Time Technique

The JIT inventory management technique is a Japanese philosophy largely linked with assembling. It focuses on having the right things in the right quality and amount in the correct place and at the expected time. It is believed that organizations that use the JIT technique enjoy increment in quality, profitability, and effectiveness, enhanced correspondence, and abatements in expenses and squanders. Hutchins (2000), Characterizes JIT as a process that is prepared for a moment response to the request without the necessity for any overstocking, either in the desire of the application being approached or as a concern of improvident characteristics all the while.

2.3.3 Vendor- Managed Inventory

One keyway to deal with inventory management is Vendor Managed Inventory. This inventory management method or technique request satisfaction whereby the merchant is completely in charge of the recharging of stock considering the opportune point of all data to the purchasers. Client responsiveness is built through this idea by lessening the free-market activity hole. Kazim (2008), identifies that upstream information exchanged to suppliers such as the current stock level and precise deals conjecture is the most vital element for the effective usage of Vendor Management Inventory.

2.3.4 ABC Analysis

The ABC is an inventory management technique that relies on that the decision a little bundle of things may usually address the weight of money estimation of the total stock. Accordingly, to effectively control inventory, ABC emphasizes that items that contribute significantly to profit should take strict control and those that contribute less significantly on profit should be given fewer control measures. The essence is for management to pay close attention to the critical few items instead of the trivial many. ABC examination is an essential action method that follows the Pareto Principle concerning an organization's arrangement of stock. Most organization attempts and oversights are depleted on managing a thing. C things get the base thought, and B things are in the centers. The ABC approach ranks using the following criteria: A things represent 70–80% of the firm's annual consumption approximation and just 10–20% of aggregate stocked items. B things represent 15–25% of annual use esteem and 30% of aggregate the stock, and C things characterize 5% of the annual application of esteem and half of the total stocked items.

2.4 Empirical Literature Review

Researchers have analyzed different inventory management practices and performance of businesses and all these studies have amassed an enormous knowledge related to inventory management and organizational performance. Xydias-Lobo & Jones (2003) argue that implementation of proper inventory management practice involves providing high-quality products at relatively less

cost. They further point out that it is essential to establish a daily ordering and frequent calculation of inventory turns. On the other hand, Ballon (2004) argues that inventory cost should be considered while taking inventory decisions. He found that inventory carrying costs typically range from 20% to 40% of inventory value. Palmer & Dean (2016), think that selection of the right inventory management practice is a must for a company's inventory management performance.

A study conducted in Nigeria by Nubia (2017) which sought to investigate the effect of inventory control on the profitability of manufacturing companies in Nigeria concludes that the inventory conversion period has no significant effect on profitability. The OLS regression analysis result of the effect of inventory conversion period on profitability shows a coefficient value of 10.0564 and a p-value of 0.0131. The coefficient value of 10.0564 shows that the inventory conversion period has a strong positive relationship with profitability while the p-value of 0.0131 which is lower than the alpha value shows that inventory conversion period positively affects the level of profitability of manufacturing companies in Nigeria.

Gill, et al., (2017), argue that excess inventory is an operational liability, because it uses valuable storage space and increases inventory costs. Raw material ordering frequency is identified as an important factor contributing to inventory cost. Frequent ordering in small quantities is considered an important strategy. This is very relevant in the context of manufacturing companies.

Studies on manufacturing companies viewed the need for a more formal procedure to calculate measures of inventory policy. Research has shown that the increasing investment in inventory combined with an increasing number of backorders and lost sales lead to lower profitability.

In his study, Koumanakos (2008) aimed at testing the hypothesis that efficient inventory management leads to an improvement in a firm's financial performance. The results revealed that the higher the level of inventories preserved, departing from lean manufacturing, by an enterprise the lower its rate of returns.

Lenny Koh et. al., (2007) studied the use of material planning methods to control material flow inventories of purchased items. The study explored the perceived planning performance of material planning methods used to control material flow in different types of manufacturing and distribution companies. They also evaluated the difference in perceived planning performance depending on the way planning parameters are determined and the methods used.

Altogether, five material planning methods were studied based on survey data. However, Lenny Koh et. al., (2007) probed a more prominent issue regarding the underlying dimensions of Supply Chain Management (SCM) practices and to tested a framework identifying the relationships among various SCM practices, operational performance, and SCM-related organizational performance. The survey study was conducted on SMEs in Turkey. The study brought out that both strategic collaboration and lean practices (SCLP) and outsourcing and multi-suppliers (OMS) factors have a direct positive and significant impact on the operational performance of SMEs and by extension manufacturing companies. However, the study found

that both factors have no direct impact on SCM-related organizational performance and only indirect and significant positive effects. Whereas the observation by Teunter (2012) was that ABC analysis is commonly used as an inventory management practice in manufacturing companies worldwide.

To practice inventory planning and control, it is essential to understand what influences inventory management. This will allow manufacturing companies to choose a suitable inventory management practice in their organization.

3. Methodology

This study adopted both the quantitative and case study research design in order to capture its essence that is; to assess the impact of inventory management on the profitability of manufacturing companies in Sierra Leone, a major manufacturing company was used as a case study. The secondary data employed in this study was collected from the financial statement of the company for the period 2015 – 2020. The company was selected as a case study for three reasons. Firstly, they are the biggest manufacturing company in Sierra Leone, having one of the largest number of employees in the private sector. Secondly, the company is one of the oldest companies in Sierra Leone and has been in existence for more than forty years in the business of manufacturing. Thirdly, the company is structured with a strong corporate governance value, publishes audited financial statements and holds annual general meetings.

3.1 Model Estimation and Specification

The study makes use of the various variables that are used in the manufacturing industry such as; Raw Materials Cost, Storage Cost, and Inventory Conversion Period. We used Returns on Assets as a proxy for the profitability of G. Shankerdas and Sons Sierra Leone Ltd. The quantitative data gathered was analysed using descriptive statistics, multiple linear regression model, tested for multicollinearity, and the serial correlation LM test. The outcome from the regression model was used to establish the impact of inventory management on the profitability of G. Shankerdas and Sons Sierra Leone Ltd. However, the level of collinearity in a multiple regression model can be identified and measured using a statistical technique known as the variance inflation factor (VIF). When the predictor variables are not linearly connected, VIF quantifies how much the variance of the estimated regression coefficients is exaggerated. The VIF test was conducted with the aim of checking for the presence of multicollinearity amongst the variables. The assumption is that; if the VIF is greater than 10 then there exist Sevier multicollinearity amongst the variables and vice versa.

The basic model specification for study is thus stated as:

$$ROA=f(ICP, RMC, SC) \quad (1)$$

Where:

ROA -----(Returns on Assets)

ICP -----(Inventory Conversion Period)

RMC -----(Raw Materials Cost)

SC -----(Storage Cost)

The econometric estimation of the above was expressed as:

$$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3+\mu_t \quad (2)$$

Where:

β_0 is the constant of the variables or the intercept

$\beta_1 \neq \beta_2 \neq \beta_3$ are the co-efficient parameters of the variables,

μ_t is the error term or disturbance of the variables

$$Y = \beta_0 + \beta_1(ICP) + \beta_2(RMC) + \beta_3(SC) + \mu_t \quad (3)$$

4. Result and Discussion of Findings

4.1 Descriptive Statistics

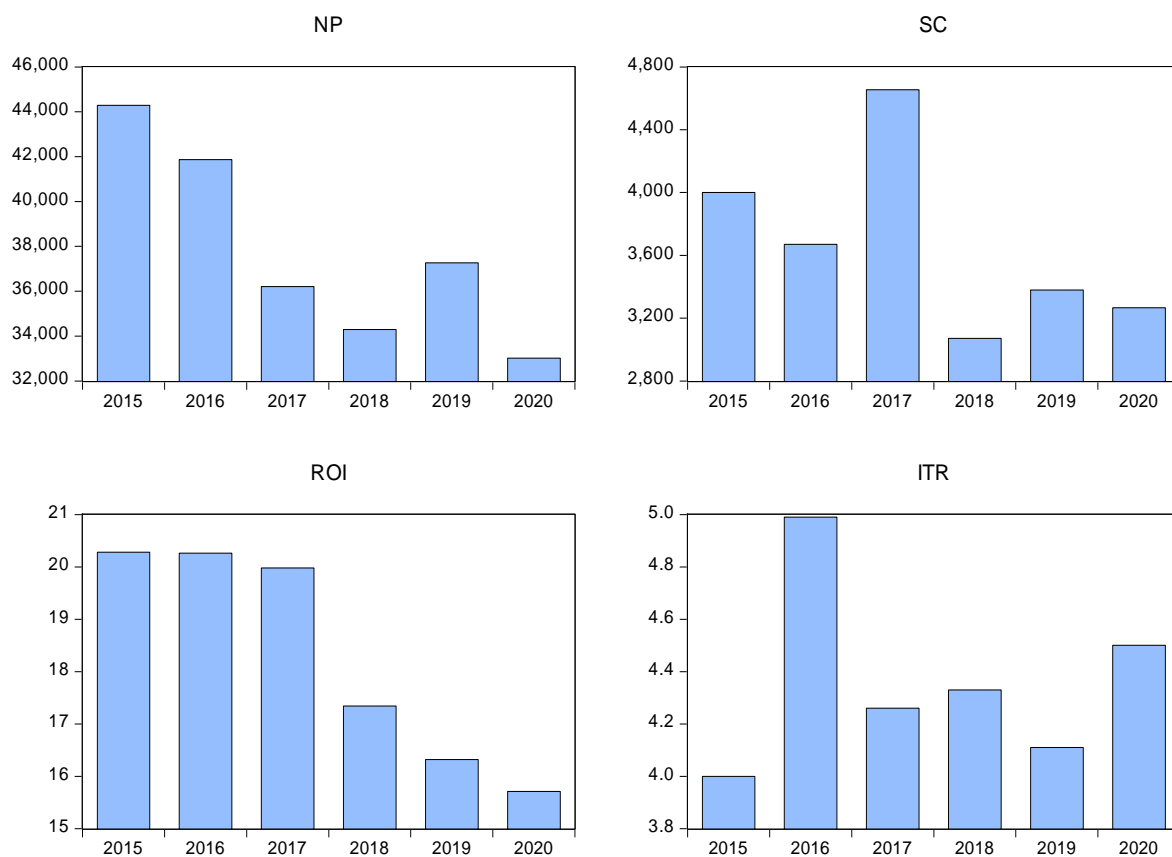
In order to check normality of the data and to exhibit the basic features of the variables that were used in the study in terms of the mean scores, the standard deviation, the minimum, the maximum and as well as the number of observations, the descriptive statistics was run using EViews 8 and the output is shown in Table 1. below.

Table 1: Descriptive Statistics

	ROA	ICP	RMC	SC
Mean	7.651667	38.33333	15440.00	3673.500
Median	7.860000	41.50000	14170.00	3524.500
Maximum	8.270000	49.00000	20000.00	4655.000
Minimum	6.800000	14.00000	13067.00	3071.000
Std. Dev.	0.566301	12.70695	2816.075	580.6461
Skewness	-0.564753	-1.328315	0.793499	0.748041
Kurtosis	1.801522	3.402962	1.986406	2.335734
Jarque-Bera	0.678033	1.805016	0.886483	0.669878
Probability	0.712471	0.405551	0.641952	0.715382
Sum	45.91000	230.0000	92640.00	22041.00
Sum Sq. Dev.	1.603483	807.3333	39651380	1685750.
Observations	6	6	6	6

Sources (Researcher`s Computation- using EView 8)

From Table 1 above, The Jarque-Bera statistics compares the alternative of non-normality to the null hypothesis of normality based on the aforementioned table. The Jarque-Bera values are significant at all levels of significance, according to the P-values for ROA, ICP, RMC, and SC which are all greater than 5% (0.05), thus, this leading to the acceptance of the null hypothesis and come to the conclusion that all the variables are normally distributed. The skewness values for ROA and ICP indicates that the variables have a negative skewness, while the skewness variables for RMC and SC are having a positive skewness.



Sources (Researcher`s Computation- using EView 8)

Figure 2: Trend Analysis of Manufacturing Performance Indicators

From Figure 2 above, NP representing the Net Profit, SC representing the Storage Cost, while ROI representing the Returns on Investment and ITR representing the Inventory Turnover Rate.

4.2 Multiple Linear Regression Method

The table below present the multiple linear regression result.

Table 2: Regression Output

Dependent Variable: ROA				
Method: Least Squares				
Date: 01/07/23 Time: 16:26				
Sample: 2015 2020				
Included observations: 6				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
ICP	-0.008904	0.009228	-0.964873	0.4364
RMC	-0.000185	3.89E-05	-4.759184	0.0414
SC	0.000464	9.53E-05	4.862845	0.0398
C	9.151875	0.888792	10.29698	0.0093
R-squared	0.985898	Mean dependent var		7.651667
Adjusted R-squared	0.964744	S.D. dependent var		0.566301
S.E. of regression	0.106332	Akaike info criterion		-1.409789
Sum squared resid	0.022613	Schwarz criterion		-1.548616
Log likelihood	8.229366	Hannan-Quinn criter.		-1.965525
F-statistic	46.60698	Durbin-Watson stat		1.654385
Prob(F-statistic)	0.021079			

Sources (Researcher's Computation- using EView 8)

The econometric result using least squares regression method indicate that Inventory Conversion Period (ICP) has a negative co-efficient value of -0.0088904 to the Return on Assets and also having an insignificant relationship (P-Value = 0.4364) to the Return on Assets. Also, Raw Material Cost proved to have negative and significant effect to the Return on Asset (P-Value = 0.0414), with a coefficient value of -0.008904. Indicating that an increase in the ROA, will ultimately lead to a decrease in the RMC by -0.000185. Furthermore, the result shows that Storage Cost (SC) has a positive and significant effect on the Return on Assets with a P-Value = 0.0093 and a coefficient of 0.000464. Implying that an increase in the Storage Cost will also lead to an increase in the Return on Assets.

With an R-squared of 0.985898, the independent variables and the dependent variable together accounted for nearly 99% of the predictive power in the dependent variable. This suggests that the factors utilized in this study cannot fully account for the dependent variable in Sierra Leone. The dependent variable's unexplained portion can be attributed to the omission of highly significant independent factors that are outside the preview of this study but can explain the dependent variable.

4.3 Multicollinearity Test

The collinearity test was conducted with the help of the variance inflation factors as presented below

Table 1: Variance Inflation Factors Output

Variance Inflation Factors			
Date: 01/07/23 Time: 16:27			
Sample: 2015 2020			
Included observations: 6			
	Coefficient	Uncentered	Centered
Variable	Variance	VIF	VIF
ICP	8.52E-05	72.48224	6.080354
RMC	1.52E-09	197.1847	5.318760
SC	9.09E-09	66.42041	1.354672
C	0.789951	419.2058	NA

Sources (Researcher`s Computation- using EView 8)

The result from the table above indicate that the presence of multicollinearity does not exist among the variables, since all of the VIF values are less than 10.

4.4 Serial Correlation LM test

The Serial Correlation test was conducted in order to check the presence of autocorrelation amongst the variables.

The table below test if any serial correlation exists.

Table 2: Autocorrelation Output

Breusch-Godfrey Serial Correlation LM Test				
F-statistic	0.608257	Prob. F (1,1)		0.5783
Obs*R-squared	2.269253	Prob. Chi-Square (1)		0.1320
Test Equation				
Dependent Variable: RESID				
Method: Least Squares				
Date: 01/07/23 Time: 16:29				
Sample: 2015 2020				
Included observations: 6				
Presample missing value lagged residuals set to zero				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
ICP	-0.013881	0.020559	-0.675181	0.6219
RMC	-6.02E-05	8.85E-05	-0.679654	0.6200
SC	0.000335	0.000442	0.757030	0.5875
C	0.215341	1.028886	0.209295	0.8687
RESID(-1)	2.884188	3.698112	0.779908	0.5783
R-squared	0.378209	Mean dependent var		1.19E-15
Adjusted R-squared	-2.108956	S.D. dependent var		0.067250
S.E. of regression	0.118577	Akaike info criterion		-1.551606
Sum squared resid	0.014060	Schwarz criterion		-1.725140
Log likelihood	9.654819	Hannan-Quinn criter.		-2.246276
F-statistic	0.152064	Durbin-Watson stat		0.980485
Prob(F-statistic)	0.937653			

Sources (Researcher`s Computation- using EView 8)

The result table 4. Above, the critical chi-square value of the observed R-squared is greater than 0.05, indicating the presence of serial correlation does not exist in the variables used in the study.

5. Conclusions and Recommendations of the Study

This study sought to investigate the impact of inventory management on the profitability of a manufacturing company. It was established from the study that Raw Material Cost have negative and insignificant effect to the Return on Asset (p-Value = 0.0414), with a coefficient value of -0.008904. Indicating that an increase in the ROA, will ultimately lead to a decrease in the RMC by -0.000185 times. On the other hand, Storage Cost (SC) has a positive and significant effect on the Return on Assets with a (p-Value = 0.0093) and a coefficient of 0.000464. Implying that an increase in the Storage Cost will also lead to a proportionate increase in the Return on Assets by 0.005 times. Finally, Inventory Conversion Period (ICP) has a negative co-efficient value of -0.0088904 to the Return on Assets and also having an insignificant relationship (p-Value = 0.4364) to the Return on Assets; Implying

that an increase in the Inventory Conversion Period (ICP) will also lead to a proportionate decrease in the Return on Assets of the firm by -0.009 times. The study therefore concluded that there is a negative and insignificant relationship between Raw Material Cost (RMC) on the profitability of the manufacturing company. The study also arrived at the conclusion that Storage Cost is having and significant relationship on the profitability of the manufacturing company. Moreover, the study finally concluded that Inventory Conversion Period (ICP) is negatively related to the profitability of the manufacturing company.

5.1 Recommendations of the Study

The recommendations of this study are in line with the study findings. It is recommended that management must be extremely cautious when dealing with Raw Material Cost, as increases in the cost of Raw Material will ultimately leads to a proportionate reduction in the ROA of manufacturing firms. The study also recommends that the government must endeavor to provide subsidies to manufacturing firms and as well as reduction in taxation to enable them embark on massive production due to the reduction on the cost of raw material which will proportionately lead to an increase in the ROA of manufacturing firms.

The study also recommends that management should endeavor to maintain an optimum stock level in order to avoid both stocks out and hold cost situations in which both have negative impacts of ROA on manufacturing firms.

Moreover, the study recommends that management must treat working capital management with caution as it has negative and insignificant effect on the ROA of the manufacturing company. The study finally recommends that management must endeavor to reduce the working capital cycle, as the longer the inventory conversion period, the more capital is tied up on stock and hence significantly affect the ROA of manufacturing firms negatively.

References

- [1] Ajan, A. & Kamal, O. (2016). Effect of Inventory Management on the Organizational Performance of the Selected Manufacturing Firms. *Singaporean Journal of Business Economics and Management Studies*, Volume 1, p. 200.
- [2] Ajeyi, E., Obafemi, T. & Araoye, F. (2021). Effective Inventory Management Practice and Firms Performance: Evidence from Nigerian Consumable Goods Firms. *American International Journal of Business Management*, 04(05052021), pp. 14-20.
- [3] Anichebe, A. (2013). Effects of Inventory Management System on Organizational Performance: Case of Grain Bulk Limited. *International Journal of Sciences*, 4(2307), pp. 10-14.
- [4] Axsäter, S. (2006). A Simple Procedure for Determining Order Quantities Under a Fill Rate Constraint and Normally Distributed Lead-time Demand. *European Journal of Operational Research*, 1(174), pp. 480-491.

- [5] Ballon, R. (2004). *Business Logistics/Supply Chain Management. Planning, Organizing and Controlling the Supply Chain*. 5th ed. USA: Pearsons-Prentice Hall.
- [6] Barde, O. (2015). Inventory Management and Performance of SMEs In the Manufacturing Sector of Harare. *An International Journal*, 2(2344), pp. 355-369.
- [7] Bowersox, D. J. (2002). *Supply Chain-Logistics Management*. International Edition ed. USA: MC Graw Hall.
- [8] Burt, J. (2016). Effect of inventory management practices on performance of small and medium scale enterprises in the cape coast metropolis. *British Journal of Administrative Management*, Volume 1, p. 7.
- [9] Child, W. (2009). Supply Chain- Logistics Management. *International Edition*, Volume 1, p. 4.
- [10] Child, W. (2015). Understanding the Business Cycle; Manage your Assets; Measure Business Performance. *International Journal of Productivity and Performance Management*, Volume 1, pp. 1-9.
- [11] Choi, T. (2012). *Handbook of EOQ Inventory Problems- Stochastic and Deterministic Models and Applications*. New York: Heidelberg, London.
- [12] De Leeuw, S., Holweg, M. & Williams, G. (2011). The impact of decentralised control on firm- level inventory: Evidence from the automotive industry. *International Journal of Physical Distribution & Logistics Management*, 41(5), pp. 435-456.
- [13] Deveshwar, A., & Dhawal, M. (2013). Inventory Management Delivering Profit through Stock Management. Ram University of Science and Technology, pp. 7-191.
- [14] Duramany-Lakkoh, E., Jalloh, S. & Jalloh, A. (2021b). Foreign Direct Investment Impact on Economic Growth. *Journal of Mathematical Science*, Volume 2, pp. 1-15.
- [15] Duramany-Lakkoh, Sajor., J. M. & Abubakarr, J., (2021a). Foreign Direct Investment and Manufacturing Sector in Sierra Leone. *Journal of Mathematical Finance*, Volume 2, pp. 10-13.
- [16] Egbunike, D., (2017). *Report on Small and Medium Enterprises*, s.l.: Ethiopia Central Statistical Agency.
- [17] Elsayed, G. (2014). Effect of Inventory Management Practices on Performance of Small and Medium-Scale Enterprises. *An International Journal*, 1(231), p. 10.
- [18] Fawcett, S. E., Ogden, J., Magnan, G. & Bixby Cooper, M. (2006). Organizational commitment and governance for supply chain success. *International Journal of Physical Distribution & Logistics Management*, 36(1), pp. 22-35.
- [19] Fornah, H. A. & Pujawan, N. (2020). *Assessing Supply Chain Practices and How They Are Perceived to Impact Performance of Firms in Sierra Leone*. Freetown, Zenith.

- [20] Gill, A., Biger & Mathur, N. (2017). The Relationship Between Working Capital Management and Profitability Evidence from the United States. *Business and Economic Journal*, 2(31), pp. 1-9.
- [21] Hutchins, D. (2000). *Just in Time*. UK. London: Gower Publishing Limited.
- [22] Ibrahim, U. (2016). Effectiveness of Inventory Management Systems on Performance of Companies. *Journal of Business and Change Management*, 6(2), pp. 1431-1445.
- [23] Kazim, S. (2008). Inventory Inaccuracy and Performance of Collaborative Supply Chain Practices. *Industrial Management and Data Systems*, Volume 108, pp. 495-509.
- [24] Koumanakos, D. P. (2008). The Effect of IM on Firm Performance. *International Journal of Productivity and Performance Management*, 5(57), pp. 335-369.
- [25] Lenny Koh, S. C. et al. (2007). The impact of supply chain management practices on performance of SMEs. *Industrial Management & Data Systems*, 107(1), pp. 103-124.
- [26] Lydiah, O. (2016). Small Enterprise Employment Growth in Rural Africa. *American Journal of Agricultural Economics*, Volume 2, pp. 1-17.
- [27] Mogere, O. (2013). Effect of inventory control systems affects performance of Gianchore Tea Factory, Nyamira County, Kenya. *International Journal of Business and Management*, Volume 2, pp. 4-14.
- [28] Mulumba, M. (2016). Effect of Inventory Warehousing Systems on the Financial Performance of Businesses in Kenya. *International Journal of Business and Management*, Volume 4, pp. 549-568.
- [29] Ndirangu Kung'u, J. (2019). Effects of inventory control on profitability of industrial and allied firms in Kenya. *IOSR Journal of Economics and Finance (IOSR-JEF)*, 7(6), pp. 9-15.
- [30] Ngugi, E., Kimutai, G. & Kibet, Y. (2019). Effect of Inventory Management Systems on Performance of Manufacturing Companies in Eldoret Town, Kenya. *The Strategic Journal of Business and Change Management*, 6(2), pp. 14-31.
- [31] Njeru, Z. W. (2016). Factors Affecting the Success of Inventory Control in the Store Division of the Thekwini Municipality Durban. *Durban University of Technology*, Volume 1, pp. 4-9.
- [32] Nubia, N. (2017). Inventory Management Practices in Manufacturing Companies. *An International Journal*, 1(12), pp. 1-20.
- [33] Agu, A. O., Obi-Anike, H., O., & Nnate, E. C. (2013). Effect of Inventory Management on The Organizational Performance of Selected Manufacturing Firms. *Singaporean Journal of Business Economics, and Management Studies*, 5(4), pp. 1-17.
- [34] Onyango, R. (2013). *Lean Enterprise and Supply Chain Performance of Pharmaceutical Companies in Kenya*. Nairobi: s.n.

- [35] Opoku, R. K. et al. (2020). Inventory Management Practices and Operational Performance of Manufacturing Firms in Ghana. *Advances in Research*, 21(10), p. 1–18.
- [36] Otieno, A. & Samson, P. (2018). Influence of Inventory Management Practices on Performance of Retail Outlets in Nairobi City County. *International Academic Journal of Procurement and Supply Chain Management*, 3(1), pp. 18-43.
- [37] Sierra Leone Ministry of Trade (2020). Commerce and Trade Report, Freetown: s.n
- [38] Statistics Kenya Bureau (2016). Industrial Performance Index, Narioni : s.n.
- [39] Statistics Sierra Leone (2021). Provisional results of Sierra Leone's 2021 Mid-Term Census, Freetown: Abdul Rashid Thomas.
- [40] Stevenson, B. (2010). *Operations Management*. 10th ed. New York: McGraw Hill Publishing.
- [41] Teunter, R. B. (2012). ABC Classification: Service levels and inventory cost. *Journal of Production and operations management*, Volume 3, p. 19.
- [42] Umar, M. (2016). The Effect of Inventory Management on Profitability. *Journal of Agricultural Economics*, 6(234), pp. 35-50.
- [43] Womack, C. (1990). ABC Classification. *Journal of Physical Distribution and Logistics Management*, Volume 1, p. 4.
- [44] World Bank Forum (2012). Economic Performance Indicators Report, Freetown: s.n.
- [45] World Bank (2015). Sierra Leone Performance Index, Freetown: Zenith Publishing.
- [46] World Bank (2021). Economic Performance Indicators. World Bank Forum, pp. 1-50.
- [47] Xydias-Lobo, M. & Jones, J. T. (2003). Quality Initiatives and Business Growth in Australian Manufacturing SMEs: an Exploratory Investigation. School of Commerce, Flinders University.
- [48] Yunusa, A. (2021). Inventory management practices and performance of manufacturing firms in Kogi State. *Journal of Good Governance and Sustainable Development in Africa*, 6(3), pp. 54-63.